

# NASA TECH BRIEF

## *John F. Kennedy Space Center*



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

### A Concept for Universal Pliers

#### The problem:

Pliers are available in many sizes and shapes for a variety of uses. To own a complete set of pliers for a given occupation or hobby, the user faces an unnecessary expense of purchasing a number of such tools.

#### The solution:

By a modification in the existing design, pliers can be made to have one pair of handles that will accept a number of different jaws.

#### How it's done:

There are two possible designs for insertion and locking of plier jaws into the handle, as shown in Figures 1 (a) and

(b). In both designs, the jaws are attached and removed by a push and twist method. The first design concept (Figure 1 (a)) is a spring-loaded bayonet mechanism. Each handle has a hole that is pinned at a point in its depth. Past the pin and held in the handle hole by the pin, is a spring. The cylindrical jaw shank fits into the handle hole. Machined into the shank is a recess of the shape shown. The jaw is inserted into the handle, engaging the internally projecting pin. Further insertion will compress

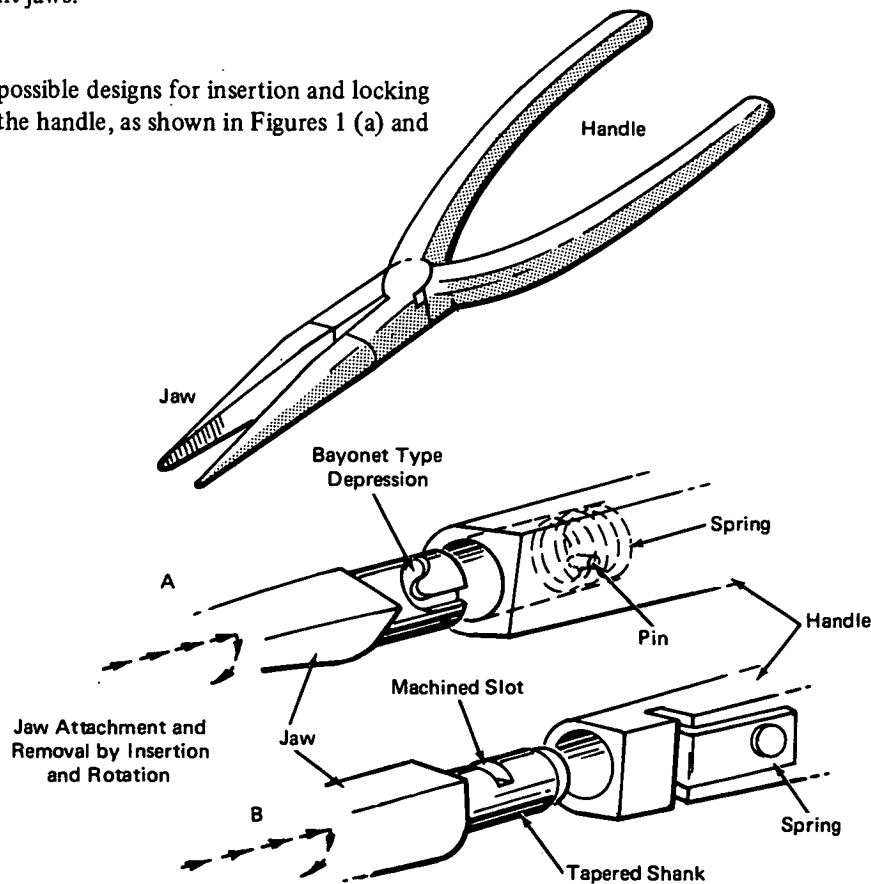


Figure 1

(continued overleaf)

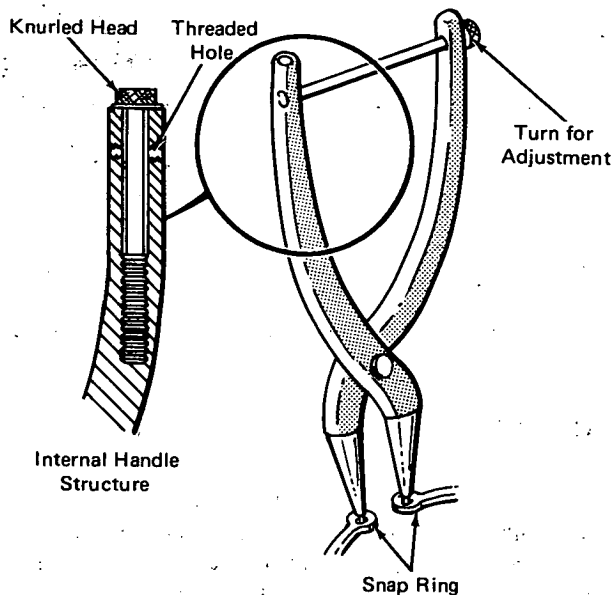


Figure 2 (a). Use of One Jaw For Rotary Work

the spring, and the shank recess will guide the jaw so that it can be rotated into the locking position in the bayonet depression.

The other design concept (Figure 1 (b)) is similar in insertion and removal techniques, but it utilizes a spring to lock and hold the jaw. When the taper in the jaw shank is inserted into the hole in the handle, the spring is forced to flex and allow jaw insertion to the point of the machined slot in the shank. A rotation of the jaw will allow the spring to enter the slot, effectively locking the jaw to rotation and pull. Removal is made by rotation to either direction which will force the spring out of the slot to the point where a straight pull will allow the jaw to be removed.

Figure 2 (a) shows another useful modification. Included in one handle of the pliers is a threaded rod with a knurled head. The rod is stored in the handle, and retained by a few threads. The rod is used to provide positioning of the handles when it is placed through a hole in one handle and into a corresponding threaded hole in the other handle. With this feature, the pliers can be used to spread such things as snap rings or to clamp onto and hold articles so the hands can be left free.

Finally, Figure 2 (b) shows the pliers when one handle and jaw are used as a rotating tool. Rethreading tapped

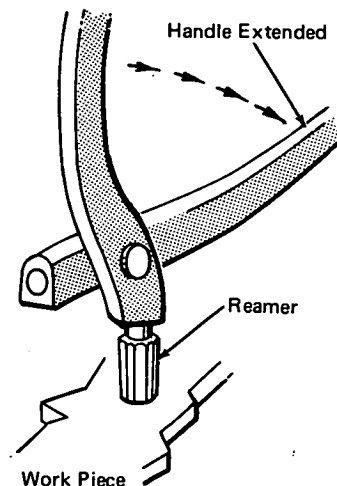


Figure 2 (b). Adjustment Feature

holes, light burring, and reaming are a few of the ways this feature may be used. The sketch in Figure 2 (b) shows a reaming operation. The unused handle is opened to its extreme position to provide additional rotating leverage.

#### Notes:

1. The above concepts are useful for light to medium duty service. A complete set of jaws may be made to suit specific hobbies or applications, i.e., electronics, watchmaking, automotive, electrical, etc.
2. Requests for further information may be directed to:  
Technology Utilization Officer  
Kennedy Space Center  
Code AD-PAT  
Kennedy Space Center, Florida 32899  
Reference: B72-10685

#### Patent status:

NASA has decided not to apply for a patent.

Source: E. T. Neal of  
The Boeing Company  
under contract to  
Kennedy Space Center  
(KSC-10768)